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Organizational Dimensions of Schools

This study was concerned with determining the basic dimensions underlying the organization of public elementary and secondary schools. Dimensions which theory and research on organizations had suggested as relevant were investigated: (1) production activities related to the teaching-learning tasks of the school; (2) maintenance activities devoted to the preservation of the school in its present form; (3) adaptive activities associated with innovative practices and change; (4) boundary-spanning activities which attract or prohibit contributions from the environment; and (5) administrative activities which co-ordinate all functions of the school. The dimensions were related to the people who are members of the organization and to the environmental forces impinging on it.

Publicly supported schools may be thought of as organizations having responsibilities or tasks which are subsumed within the broad spectrum of functions associated with education as a societal institution. Furthermore, these organizations evolve their own ways of controlling and administering the systems of practices and social roles which are developed to deal with their special problems (Inkeles, 1964). Katz and Kahn (1966) described this evolutionary process as a series of identifiable stages occurring over time in most organizations. They observed that once a pattern of task activities had been formed in an organization, other patterns of activities are built up to facilitate the performance of the original task activities and to ensure the continued existence of the organization. These patterns of activities they designated maintenance, boundary, adaptiveness, and administrative; together with the production activities, these activities comprise the whole organization. If these distinctive activity patterns are present within organizations, then the extent to which each is present would constitute a kind of measurement, and the combination of these dimensions would form a characteristic profile of the organization. Moreover, distinctive variations among these

dimensions found in different organizations might be useful in classifying them.

In the case of schools, it seemed possible to hypothesize, for example, that some would have a much larger production dimension in terms of emphasis on task activities, and a rather smaller adaptiveness dimension in terms of openness to innovation and change. On the other hand, some school organizations might be found to have a comparatively large maintenance dimension because much of the activity of the school is directed toward the preservation of the organization itself, while the boundary dimension remained small since there would be a tendency to reject ideas and other contributions from the larger environment and to make little effort to contribute to the larger environment. In some schools adaptiveness activities might form a proportionately large dimension, while in others it might remain relatively small.

The Problem

The concept of organizations consisting of a plurality of interrelated activities raises a number of questions. Do patterns of activities exist in schools similar to those observed by Katz and Kahn in other organizations? If they do exist, to what extent is each present? Do organizations differ from one another in terms of the dimensions of these patterns of activities, that is, are they present to a greater or lesser degree in some schools than in others? Might schools be identified by means of their characteristic organizational dimensions? The problem became one of developing a research strategy that would enable the researcher to discover the answers to some or all of these questions.

The Strategy

If it is posited that patterns of organizational activities do exist in schools, then it should be possible to ask organizational members to record their observations of them and to indicate the extent to which they perceive them to be present. By using these responses as measures the researcher could determine to what extent a particular pattern of organizational activity is judged to be characteristic of the school by its members. Since the patterns of activities identified by Katz and Kahn (1966) encompass the total organization, variables related to different levels of organizational analysis were deemed to be suitable—personal, informal group, formal organization, and the pattern and process of organization.

Yuchtman's (1966) study of insurance companies offered a useful precedent along these lines. He used variables developed by Bowers and Seashore (1966) that referred to several social-psychological aspects of

organizations. By means of factor analysis Yuchtman identified several organizational dimensions that were stable over time. On the basis of these findings it seemed possible that adaptation of the variables to school situations might reveal characteristic organizational dimensions of schools.

A questionnaire was developed to be administered in schools. The analysis of the responses was used to discover some of the answers to the questions raised earlier about the organizational characteristics of schools.

Factor Analytic Study

Eighty-two Likert-type items adapted from Yuchtman's questionnaire were administered to 659 teachers in fifty schools of various types and sizes within the province of Alberta (Hersom, 1969). A random sample of 175 responses was submitted to a series of factor analyses in order to discover whether there were independent underlying dimensions present. A high degree of replicability became apparent in successive analyses indicating the stability of the dimensions despite changes in the number of variables when items with loadings less than .400 were deleted. In order to reduce the amount of error variance, the original eighty-two items were submitted to an alpha factor analysis. In the final form of the questionnaire, sixty-six items were retained, assigned to nine scales.

Scales were named by consulting the theory and research findings described in the literature on organizations. The equamax factor loadings and the items included in each of the nine scales are shown in the table contained in the Appendix. The scales are described briefly here:

Production Emphasis

Factor I accounted for 6.05 percent of the variance among all items. The eight items comprising this factor seem to refer to the various means used to stress the production, or task accomplishment activities within a school.

Production Support

Factor II accounted for 5.64 percent of the total variance in the data. The factor consists of thirteen items which seem to deal with activities designed to facilitate goal attainment—communication, provision of materials and ideas, and the development of mutually dependent relations among members. These are some of the behaviors which are thought to transform human energy into task achievement.

Control

The third factor, composed of eight items, accounted for 4.96 percent of the variance among all items. Items in this factor seem to relate to the coordination and ordering of the diverse interests and potentially diffuse behavior of organizational members. The distribution of rewards and punishments and evaluation procedures are apparent in this factor.

Collegiality

Factor IV, consisting of eight items, accounted for 4.44 percent of the variance in the data. This factor seems to deal with the extent to which teachers and principals view themselves as peers working together to carry out the tasks of the school.

Autonomy

Factor V accounted for 4.39 percent of the variance among all items. By reflecting the scores for these items, they seem to indicate the degree to which teachers perceive themselves to be free from control by external agents.

Flexibility

Ten items comprising Factor VI accounted for 3.39 percent of the total variance. Items in this factor apparently relate to the ways in which the resources and capabilities of school personnel are used within the organization to accommodate change.

External Relations

Factor VII, composed of five items, accounted for 3.31 percent of the variance among all items. The items appear to be concerned with the school's success in establishing viable relationships with the larger environment. By means of the principal's influence and capability in attracting support, the school may gain resources needed for organizational growth and effectiveness.

Professional Exchange

The four items comprising Factor VIII accounted for 3.20 percent of the total variance. Dubin (1965) has suggested that for particular types of organizations such as schools, members require closer working relationships than are needed in some other kinds of organizations. The items in this factor seem to refer to possible working relationships teachers might draw upon for assistance in accomplishing their professional tasks.

Openness

Factor IX accounted for 3.02 percent of the variance in the data. The four items comprising this factor seem to be concerned with ways in which groups outside of the school and the school system are perceived as sources of expert knowledge and ideas that may be introduced into the school by the staff.

Reliability estimates for the nine scales were based on responses from 492 teachers which had not been used in the development of the questionnaire. Item intercorrelations and item-scale correlations were calculated and found to be acceptable within the limits recommended by Guilford (1965) to ensure both satisfactory reliability and good validity.

The results of the factor analytic study indicated that it should be possible to identify existing organizational dimensions of schools and to distinguish differences among schools based on the proportions of these dimensions as perceived by the teachers.

Differences Between Schools

Teachers in ninety-nine schools located in a metropolitan area in another Canadian province responded to the questionnaire. Scores for each school were calculated by using the mean scores on each of the nine scales and standardizing them to a mean of 50 and a standard deviation of 10 to permit comparisons among schools.

It was found that the organizational dimensions of schools as indicated by scale scores varied according to type of school (Table 1). Organizational dimensions of high schools (seventh to twelfth grade) differed from those of elementary schools (kindergarten to sixth grade). Teachers in high schools rated the External Relations, Openness, Autonomy, and Control dimensions greatest. The dimensions associated with task achievement (Production Support and Production Emphasis) and with the adaptiveness activities of the organization (Professional Exchange and Flexibility), were perceived to be of lesser significance in their schools.

On the other hand, elementary school teachers perceived their schools as having greater task and adaptiveness oriented dimensions than maintenance dimensions (Autonomy and Control).

TABLE 1

COMPARISON OF MEAN SCORES FOR FSCQ SCALES OBTAINED BY TWO SELECTED GROUPS OF ELEMENTARY AND HIGH SCHOOLS

FSCQ Scales	Mean Scores for Groups	
	High Schools	Elementary Schools
I Production Emphasis	47.85	53.77*
II Production Support	47.43	53.42*
V Autonomy	53.78*	46.15
III Control	51.34*	48.54
VIII Professional Exchange	44.99	55.66*
VI Flexibility	48.80	51.99*
VII External Relations	53.33*	53.37*
IX Openness	54.85*	47.23
IV Collegiality	49.05	49.14

*Mean scores are significantly higher within group.

Discussion and Conclusions

The social-psychological dimensions of school organizations identified by the study seem to be related to the organizational dimensions conceptualized by Katz and Kahn (1966). Seven of the dimensions appear to relate directly to the Katz and Kahn model according to the scores assigned by the teacher respondents as follows:

Production Dimension: Production Emphasis and Production Support scales;

Maintenance Dimension: Autonomy and Control scales;

Adaptiveness Dimension: Flexibility and Professional Exchange scales;

Boundary-spanning

Dimension: External Relations scale.

Scores on two of the scales developed in the preliminary study were inconclusive. Variables included in the Collegiality and Openness scales should be examined closely in subsequent studies using the questionnaire.

The administrative dimension posited in the concept of organization used for the study was identified only indirectly. Since variables associated with each dimension contained overt reference to the principal's influence on school activities, it may be that the administrative dimension is revealed by the relationships among organizational dimensions which emerge in a school under his co-ordination and adjudication. Thus, the overall profile of the various dimensions could indicate the administrative pattern of activities within the school.

Upon considering the relationships among organizational dimensions in schools revealed by the study, a certain similarity to the findings of studies employing the Leader Behavior Description Questionnaire is apparent. The two theme dimensions of leader behavior described as initiating structure (task oriented behavior) and consideration (employee oriented behavior) have strong parallels in this study, since both task (Production Emphasis, Production Support) dimensions and maintenance (Autonomy, Control) dimensions were identified clearly by teacher responses.

The indication that the questionnaire developed for the study can be used to identify organizational dimensions of schools may make it particularly useful to administrators and others who desire to introduce change into a school. By revealing existing dimensions, planned activities might be undertaken to alter or strengthen these in order to bring about desired organizational growth. Future research might assess the contribution which the instrument could make to bringing about organizational change.

Further development of the questionnaire might be undertaken: (1) the questionnaire could be used in conjunction with the LBDQ XII and a comparison made with the findings of the study completed by Anderson and Brown (1966) in which three clusters of effective principals were identified; (2) each of the scales could be analyzed using the method described by Sergiovanni, Metzcus, and Burden (1969) which takes into consideration variations in situations affecting teacher responses to questionnaire items; and (3) further analysis could be made to refine the scales and to increase the reliability of the questionnaire.

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APPENDIX
EQUAMAX FACTOR LOADINGS AND VARIABLES FOR SCALES

TABLE A
EQUAMAX FACTOR LOADINGS AND VARIABLES FOR NINE SCALES

Item No.	h^2	Factor Loading	Variable
Scale I: <u>Production Emphasis</u>			
11	.513	.437	1. The principal encourages extra work.
19	.368	.479	2. The principal asks to be informed about decisions made by teachers.
21	.536	.599	3. The principal lets the staff know what is expected of them.
29	.372	.411	4. The principal holds meetings of the staff.
31	.579	.673	5. The principal emphasizes the importance of finding and introducing ways of improving the teacher-learning situation.
41	.580	.645	6. The principal stresses the importance of high morale.
49	.634	.613	7. The principal keeps informed about the work that is being done.
51	.498	.407	8. The principal helps teachers use all kinds of technological aids to improve the teaching-learning situation.
Scale II: <u>Production Support</u>			
2	.665	.519	1. Teachers find that the principal can be counted on to have information and knowledge about most school and educational problems.
10	.651	.541	2. Teachers feel that the principal is a good example of the "professional educator."
12	.725	.508	3. Teachers in this school know that they can get worthwhile help in solving school problems when they ask the principal about them.
22	.620	.598	4. The principal makes others feel at ease when talking with him.
30	.765	.700	5. Teachers in this school feel that the principal belongs to a team that works together.

TABLE A (Continued)

Item No.	h^2	Factor Loading	Variable
Scale II: <u>Production Support</u> (Continued)			
32	.552	.459	6. Teachers pass along facts and ideas concerning school matters to the principal.
40	.728	.575	7. The principal is friendly and easily approached.
42	.547	.500	8. Teachers feel that the principal's knowledge of educational matters is greater than theirs.
50	.477	.551	9. Teachers have the same professional ideals and standards that the principal holds.
52	.664	.504	10. Teachers go to the principal to ask advice.
59	.640	.626	11. Teachers in this school feel the same way about most school matters as the principal does.
61	.704	.665	12. Teachers do what the principal wants because they respect his competence and good judgment.
66	.656	.527	13. Teachers in this school feel that they belong to a team that works together.
Scale III: <u>Control</u>			
3	.691	.802	1. Teachers follow the principal's suggestions because he can recommend promotions.
13	.752	.845	2. Teachers follow the principal's suggestions because he can recommend tenure in this school system.
23	.703	.813	3. Teachers are likely to cooperate with the principal because he can recommend that a teacher's contract not be renewed with this division.
33	.739	.766	4. Teachers do what the principal wants because he can penalize or otherwise disadvantage those who do not cooperate.

TABLE A (Continued)

Item No.	h^2	Factor Loading	Variable
Scale III: <u>Contwpl</u> (Continued)			
43	.588	.674	5. Teachers cooperate with the principal because he can give them a poor rating on the teacher evaluation scale.
53	.645	.769	6. Teachers want to cooperate with the principal because he can influence the decision as to whether a permanent teaching certificate is granted or not.
57	.578	.620	7. Teachers in this school are trying to get ahead at each other's expense.
62	.702	.722	8. Teachers do what the principal wants because he can make the situation rather unpleasant if they don't.
Scale IV: <u>Collegiality</u>			
4	.571	.629	1. Teachers depend on other teachers for suggestions and advice on particular problems they face in their work.
14	.628	.681	2. Teachers help one another to apply relevant educational developments to their daily work.
24	.443	.474	3. Knowledge on the part of fellow teachers who can be consulted concerning matters related to curriculum and instruction, pupils, and class organization, is an important source of professional assistance.
34	.531	.473	4. The principal actually influences matters affecting the performance of the school as a whole.
54	.665	.607	5. Teachers in this school like one another.
58	.704	.755	6. Teachers pass along facts and ideas concerning educational matters to other teachers--in discussions at meetings, or in private, by memo or telephone.

TABLE A (Continued)

Item No.	h^2	Factor Loading	Variable
Scale IV: Collegiality (Continued)			
63	.538	.458	7. Teachers pass along facts and ideas concerning educational matters to the principal--in discussions at meetings or in private, by memo or telephone.
65	.663	.763	8. Teachers receive facts and ideas concerning educational matters from other teachers--in conversations at meetings or in private, by memo or telephone.
Scale V: Autonomy*			
5	.435	.598	1. The superintendent actually influences matters affecting the performance of the school as a whole.
15	.596	.477	2. Teachers in this school system are expected to follow the principal's suggestions.
25	.553	.463	3. Teachers do what the principal wants because he has a legitimate right, considering his position, to expect that his suggestions will be carried out.
35	.493	.607	4. Teachers follow the principal's directions because they consider it a part of their professional responsibility to do so.
45	.479	.529	5. Teachers do what the principal wants because he can give special help and benefits to those who cooperate with him.
55	.494	.576	6. The Department of Education actually influences matters affecting the performance of the school as a whole.

*Scores are reflected.

TABLE A (Continued)

Item No.	h^2	Factor Loading	Variable
Scale VI: <u>Flexibility</u>			
1	.527	.497	1. The principal encourages teachers to experiment with new ways to improve their teaching.
6	.688	.646	2. The principal puts into operation suggestions made by teachers.
9	.528	.475	3. The principal passes along facts and ideas concerning educational matters to teachers (in discussions at meetings or in private, by letter, or telephone).
16	.453	.436	4. The principal reports progress to the staff.
26	.678	.682	5. The principal encourages teachers to express their opinions and is influenced by them.
36	.553	.430	6. When solving problems or making decisions about school and staff problems, the principal takes up questions with the staff <i>as a group</i> .
39	.470	.330	7. When solving problems or making decisions about school and staff problems, the principal takes up questions <i>individually</i> with the persons directly involved.
46	.650	.564	8. The principal is willing to make changes.
56	.616	.589	9. The principal accepts the opinion of the staff in solving problems or making decisions.
60	.721	.682	10. The principal respects opinions of teachers and bases school policy on them.

TABLE A (Continued)

Item No.	h^2	Factor Loading	Variable
<u>Scale VII: External Relations</u>			
7	.639	.721	1. The principal can influence the superintendent.
17	.506	.421	2. The principal can influence the Department of Education.
27	.499	.667	3. The principal is able to influence the school board.
37	.605	.688	4. The principal is able to influence community groups.
47	.407	.484	5. The principal can attract and maintain parent support for school activities.
<u>Scale VIII: Professional Exchange</u>			
8	.544	.643	1. The superintendent (and/or central office staff) helps teachers apply relevant educational developments to their daily work.
38	.364	.475	2. Outside experts brought in by the school system provide helpful assistance in matters related to curriculum and instruction, pupils, and class organization.
48	.526	.578	3. The principal helps teachers apply relevant educational developments to their daily work.
64	.554	.689	4. The Department of Education helps teachers apply relevant educational developments to their daily work.
<u>Scale IX: Openness</u>			
18	.551	.599	1. The teachers' professional organization helps teachers to apply relevant educational developments to their daily work.
20	.495	.466	2. Teachers and the principal of this school attend many of the same meetings and social functions.

TABLE A (Continued)

Item No.	h^2	Factor Loading	Variable
Scale IX: <u>Openness</u> (Continued)			
28	.639	.585	3. The teachers' professional organization actually influences matters affecting the performance of the school as a whole.
44	.514	.416	4. The teaching staff in this school actually influences matters affecting the performance of the school as a whole.

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Equality of Educational Opportunity: A Canadian Perspective

In Federalism for the Future, the Canadian Government accepts equalization of economic opportunity as a primary federal responsibility. This implies a commitment to the importance of equalization of educational opportunity. This commitment is in contrast both to the political heritage of the two charter founding groups and to what is known about the reality of educational opportunity as reflected by contemporary educational systems. The commitment raises two major questions: (1) What kinds of educational policies will remove inequalities? (2) What are the social and political implications of such policies? Canadians are ill-equipped to develop rational policies designed to eliminate sources of inequality, largely because of the lack of definitive Canadian research which addresses the problems associated with removing the inequalities.

At the Constitutional Conference in February, 1968, the Government of Canada stated as a principle of federalism that one of the "... areas of responsibility essential to the apparatus of the modern sovereign state" (Government of Canada, 1968, p. 38) is equalization of opportunity. This statement referred primarily to the equalization of economic opportunity, but a clear implication for education followed from the fact that any attempt to equalize economic opportunity by redistributing financial resources would necessarily have an impact on provincial systems of education and on the degree of educational opportunity enjoyed by the clients of those systems. The underlying concept on which this principle of federalism is based is the cardinal democratic value of equality.

Traditionally, equality has played a central role in the evolution of democracy as a political ideology. Contemporary democratic tradition has been characterized by two distinguishable strands: the Anglo-American, which derived from the political theory of John Locke, gave primary emphasis to liberty; the French, which derived from the political theory of Jean Jacques Rousseau, gave primary emphasis to equality (Sabine, 1952, p. 452). Although these two philosophic positions have been discrete, a gradual convergence occurred between the values of liberty and equality which confirmed their interdependence. Today, the interdependence of these values is an underlying assumption of democratic theory.

Since education is generally recognized as essential to the process of democratization, an analysis of the importance of the values of equality and liberty in shaping the Canadian political heritage seemed an appropriate departure point from which to appraise equality of educational opportunity in the Canadian context (Manley-Casimir, 1968). Furthermore, the publication of the Coleman Report in the United States (Coleman and others, 1966) and the debate it has engendered provided a timely crosscultural perspective.

Specifically, answers were sought to the following questions: (1) Historically, what have been the dominant political values of the charter cultural groups? (2) What specific inequalities exist in provincial systems of education? (3) How has the concept of equal educational opportunity developed in the United States? (4) What are some of the implications of equalization strategies presently under discussion in the United States for the Canadian context?

Dominant Values

The French Canadian Experience

An historical and sociological examination of the French Canadian political tradition suggests that the democratic values of liberty and equality have not played a major role in the French Canadian experience.

As a colony, New France was modelled on the *Ancien Régime*. The authoritarian structure of government manifested in the governor and intendant, together with the rigid, quasi-feudalistic social structure and the social philosophy of the Roman Catholic Church operated as mechanisms of social control which succeeded in maintaining an homogeneous ethnic group with a distinctive culture, way of life, and set of values.

The change of political control in 1763 nominally ended the French form of colonial government, but the Roman Catholic Church became the crucial social agency in the defense of the linguistic, religious, and cultural values of French Canada against assimilation by English Can-

ada. In addition, the Church insulated the people of Quebec from the notions of liberalism, democracy, and secularism that developed in France under the influence of Voltaire and Rousseau. Hence, French Canada was not exposed to the egalitarianism of the French Revolution.

Moreover, the introduction of democratic institutions into French Canada between 1791 and 1848 occurred not from the desire of the French Canadian but as an innovation by the conquerors. Nevertheless, French Canada accepted democratic institutions, seeing in these institutions means by which French culture might be defended. As P. E. Trudeau points out:

. . . they hammered the process of parliamentary government into a defensive weapon of racial warfare, and—as Catholics—they believed that authority descendeth from God in God's good time. (Trudeau, 1958, p. 304)

H. F. Quinn appraised the significance of democratic values to French Canada in these terms:

Although the French Canadian may have a democratic system of government, he has never really understood or accepted the theoretical principles and assumptions on which parliamentary democracy is based. Concepts such as "the sovereignty of the people," "the responsibility of government to the governed," or "civil rights" play little or no part in his political thinking. In other words, we are presented with the paradox of a people with democratic institutions but without strong democratic convictions. (Quinn, 1963, p. 15)

The English Canadian Experience

The evidence examined in this inquiry suggests that there has been a strong tory influence in English Canada manifested originally in the Loyalists who fled from a revolution predicated on the values of equality and liberty. They brought with them their belief in the institution of the monarchy and an hierarchical social structure, their preference for and loyalty to Great Britain as a social model, and their acceptance of the fact of economic inequality. The congruency of these beliefs with those of the politically dominant Family Compacts resulted in the rapid assimilation of the Loyalists; consequently, there appears to have been a greater acceptance of limitation, of hierarchical patterns and anti-republicanism.

Although democratic institutions developed as a result of the fight for responsible government between 1815 and 1848, the movement occurred within the institutionalized framework of the contemporary political structure and as such was a concession rather than a deliberate innovation by the dominant elite to the demands of the governed. Moreover, the settlement of the frontier following the Canadian Pacific Railroad appeared not as a democratizing process, but rather as an outgrowth of the vested economic interests and values of the dominant tory elite.

Thus, the tory values of elitism and ascription appear to have been more influential in shaping the English Canadian political heritage than the democratic values of equality and liberty.

In general terms, both French and English Canadian experiences have been reactive rather than radical. Neither culture group has generated a profound social revolution based on a carefully articulated set of charter values. Both have been characterized by the explicit awareness of the need to preserve the existing social order and both have occurred within a traditional set of values among which equality and liberty have not played a dominant role. As John Porter notes, "If there are Canadian values, they tend to be counter-revolutionary, colonialist, conservative and monarchical (rejection of republicanism, for example)" (Porter, 1966, p. 101).

Sources of Inequality

The absence of a strong commitment to the egalitarian ideology is reflected in the degree of educational opportunity afforded by the provincial systems of education. Recently, John Porter commented on the existence of fundamental inequalities of educational opportunity in Canada (Porter, 1968). He identifies three broad sources of inequality: socio-economic, structural, and cultural.

Socio-economic factors include regional differences in educational facilities, inequalities of income and wealth, family size, and religion. Structural factors involve inequalities arising from within the educational systems and processes themselves; for example, inequalities arising from different kinds of schools, streams and programs designed to cater to different needs and aptitudes among pupils. Cultural factors concern inequalities deriving from psychological attitudes and values which inhibit high educational aspiration; for example, the low evaluation placed on education by the working class subculture.

In a recent study in the United States, A. E. Wise sought ". . . to determine whether the absence of equal educational opportunity within a state, as evidenced by unequal per-pupil expenditures, may constitute a denial by the state of the equal protection of its laws" (Wise, 1968, p. 4). Using the criterion of per-pupil expenditures to appraise equality of educational opportunity in Canada, significant regional differences exist between provinces and within provinces. (Cheal, 1963). Cheal tabulated the total per-pupil and pre-capita expenditures on elementary and secondary education among provincial school systems for the biennial period from 1952 to 1960 (Cheal, 1963, pp. 47-53). He showed that from Ontario westward the level of per-pupil expenditure for education was significantly higher than for Quebec and the Atlantic provinces. In particular, the provinces of British Columbia, Ontario, Alberta,

Manitoba and less precisely Saskatchewan tended to be characterized by economies with a higher level of personal income, more urbanization, a higher level of education, and more immigrants; these provinces also had fewer dependents, less inequality of income, and smaller proportions of Roman Catholics. Quebec and the Atlantic provinces were characterized by the reverse of these features. I. W. Paterson's analysis revealed the existence of a complex set of factors amongst which personal income, family size, rural-urban split, religious affiliation, enrolments beyond school-leaving age, and school size were key determinants of provincial expenditures for education (Paterson, 1967). Considered together, these studies suggest that socio-economic inequalities affecting educational opportunity are built into Canadian society. This condition, in part, derives from the lack of a strong commitment to the egalitarian ideology, the social class structure of Canadian society, the division of political power along class lines, the structure of federal government and the division of federal-provincial responsibilities. Insofar as the resources made available for education reflect the dominant values, the wide differences evident in per-pupil and per-capita expenditure reveal a commitment to *differential* educational opportunity rather than to *equal* educational opportunity.

The relative absence of cross-provincial data on the structural and cultural sources of inequality prevents any definitive conclusions and pinpoints the need for research in these areas. In particular, research is required to establish whether the different kinds of schools, programs and facilities tend to equalize or to differentiate still further between minorities and social classes.

In broad terms, the existence of socio-economic, structural, and cultural inequalities testifies to differential educational opportunity in Canada. This conclusion is consonant with the elitist and hierarchical nature of Canadian society and is reinforced by the presence of a small but very select group of private schools predominantly patronized by the elitist families. Social class and education thus seem to have a reciprocal and supportive relationship.

The United States Experience

Although Canada has not been strongly committed to the equalization of opportunity, the United States has a legacy of attempts to equalize educational opportunity. J. Coleman has identified five major stages in the development of a concept of equal educational opportunity in the United States (Coleman, 1968, pp. 7-22).

The first stage was characterized by free education and was predicated on the belief that all children must be exposed to the same curriculum in the same school. This stage evolved into a second stage in

response to the need for more appropriate curricula than that provided by the uniform classical curriculum designed for college entrants. Consequently, the second stage was distinguished by the emergence of differentiated curricula which matched the student's expected career to a specific curriculum.

The third stage derived from the United States Supreme Court's ruling of 1896 which upheld the southern states' contention of "separate but equal" facilities; by adopting the "separate but equal" position, the notion that equality depended on the opportunity to attend the same school was explicitly negated. The fourth stage began in 1954 when the Supreme Court ruled that legal separation by race was inherently unequal. The fifth stage commenced with the United States Office of Education Survey of Equality of Educational Opportunity. This survey was carried out under a mandate in the Civil Rights Act of 1964 and was characterized by a shift toward equality of educational opportunity measured in terms of the effects of schooling (Coleman and others, 1966).

The fifth stage has extended the concept of educational opportunity to mean equality of results given different individual inputs. Thus full equality of educational opportunity exists when the average achievement level of two population groups that start at different average achievement levels come to be identical at the end of the period of formal schooling. Thus the primary responsibility for creating achievement lies with the educational institution, not the child.

The contemporary development of educational opportunity in Canada appears to be broadly congruent with stage two of the United States' experience. Typically, provincial systems of education have adopted differentiated curricula which function by matching the child to the program in terms of his expected future. However, this practice induces two further inequalities: (1) it accepts as given the future post-secondary occupational or educational career of the student; and (2) it explicitly matches the expected future of the student to the curriculum, thereby eliminating several avenues of opportunity. Moreover, where ethnic minorities like the Eskimos and Canadian Indians or religious minorities like the Roman Catholics outside of Quebec are concerned, the provision, in some parts of Canada of separate facilities suggests a high degree of articulation with the 1896 United States Supreme Court decision. Consequently, if equal educational opportunity is to be provided for all Canadians of all ethnic groups, the radical conception of equality of educational opportunity that has emerged in the United States must be applied to the Canadian context.

Equalization Strategies

The recent enunciation by the Canadian government that the equalization of opportunity is a primary federal responsibility has the force

of an explicit commitment to the principle of social justice through equality. As such, this commitment is in contrast both to the political heritage of the two charter founding groups and to the reality of educational opportunity as reflected by contemporary provincial educational systems. The commitment raises two major questions: (1) What kinds of educational policies will remove inequalities? (2) What are the social and political implications of such policies?

Again the experience of the United States provides a useful perspective. Both the Coleman Report and the report of the United States Commission on Civil Rights (U.S. Commission on Civil Rights, 1967) have documented the massive inequalities present in United States public school education and have demonstrated the marked lack of success achieved by the policy of racial integration as the sole mechanism for equalizing educational opportunity. Three major alternative equalization strategies have been proposed: compensatory education, community control of the schools, and the educational voucher scheme.

The underlying principle of compensatory education is that the school must serve as the social mechanism to overcome the educational disadvantage imposed on students by the socio-economic and cultural inequalities of their environment. Typically, compensatory education involves the injection of large amounts of financial, human and material sources into specially designed programs. Unfortunately, there is no evidence so far that any compensatory program has produced substantial gains in achievement (Cohen, 1968, pp. 114-137).

In essence, the idea of community control of the schools is predicated on the notion that local residents should elect their own school governing boards and hire their own administrators. In this way, the administration of the school would be accountable to the community. Moreover, community control over the schools would counter the feeling of powerlessness that pervades many parts of the larger urban centers, in particular the ghettos. At present, experiments with community control are largely restricted to New York City, for example, the Ocean Hill-Brownsville school district. So far it is too early to appraise the success of the program.

The third alternative involves the educational voucher system which is theoretically designed to eliminate economic inequalities by the provision of an educational voucher (e.g. \$1,200) for each school-age child in a family earning under a given poverty criterion (West, 1965; The Institute of Economic Affairs, 1967). Thus the parents would be free to choose and then to purchase what they consider to be the best available education from any kind of school. To date, this form of free market in education has not been implemented so no measure of effectiveness exists.

Consideration of equalization strategies spotlights some important

social and political implications. It is particularly evident that equality of educational opportunity requires not only a strong commitment to the idea in principle but also the realization that implementation of the idea as a political reality requires major changes in society at large, changes which cannot be made by the educational system acting by itself. One of these changes involves the redistribution of political power between classes, races, and minority groups of all complexions.

In essence, equalization of opportunity in Canada involves a process of social reconstruction in accordance with the principle of equality. Since no society has unlimited resources, any redistribution of resources will inevitably benefit the "poor" to the disadvantage of the "rich." Consequently, the core of the dilemma is a covert conflict between the rich and the poor, the politically powerful and the politically impotent. On a small scale, redistribution of opportunities may not meet much opposition, but once the costs rise above the threshold of preference for the dominant class structure, overt conflict may ensue. With the ideological background of the charter groups in Canada, it is likely that the redistribution of political power will occur as a result of political action, and then only when the dominant elite sees the strategy as being in its own interest.

Conclusion

The experience of attempts in the United States to remove some of the inequalities in educational opportunity by means of integration and compensatory education appear to have had very limited success so far. A primary reason has been the lack of explicit knowledge of what mechanisms and policies will achieve specific ends.

Canada now has a formal commitment to the equalization of economic opportunity and derivatively to the equalization of educational opportunity. However, Canada is ill-equipped to develop rational policies designed to eliminate sources of inequality, largely due to the paucity of definitive Canadian research. If the federal government intends to operationalize its commitment, then a variety of research institutions across Canada must attack the problems associated with removing these inequalities. The role of the federal government must be to furnish the necessary funds so that a comprehensive cross-provincial study may be undertaken similar in scope to the Coleman study.

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A Computer Program for Drill in Basic Number Operations¹

A computer program has been developed for the IBM 1500 System at The University of Alberta which may be used in a variety of research and teaching situations in the area of basic number operations. No research is reported in this paper. The program has been tested and debugged, however, and is now operational. This report presents a description of the program, and some suggestions for a number of possible applications.

During the past five years a considerable amount of work has been carried out in mathematics learning using computer consoles, both as research devices and as practical systems for individualizing instruction.

Much of this work has been carried out at the Institute for Mathematical Studies in the Social Sciences at Stanford University under the direction of Patrick Suppes. As this work has been concerned primarily with developing *general* psychological models of mathematics learning, the programs of computer instruction evolving from these models cater for individual differences mainly in learning rate rather than qualitative differences that may exist between children in learning style. Where Suppes' research has indicated individual differences in type of algorithms used in solving simple arithmetic problems, these differences have been attributed to patterns of previous instruction rather than to differences in information processing styles.

1. The research program on which this paper is based is supported by a grant from the Alberta Human Resources Research Council. The computer program was written by R. Mullen under the direction of D. Fitzgerald. Complete documentation may be obtained from the technical library of the Division of Educational Research, The University of Alberta.

The computer assisted instruction (CAI) program reported in this paper was developed as a means of studying the interaction between characteristics of the learner and different sequences of instruction. The general nature of the research is, therefore, quite different from the Stanford approach. By studying the performance of children on the relatively simple tasks presented in this program in relation to relevant personality, aptitude and cognitive style variables, it is hoped to develop an individual difference model rather than a general model of mathematics learning.

The Program

The IBM 1500 System at The University of Alberta on which the program is operational supports sixteen terminals. Once a program or course has been developed, it is possible for up to sixteen students to work on the course simultaneously. Each terminal is independent of the others; thus each student progresses at his own speed.

A terminal consists of three devices, all controlled by an IBM 1130 computer, a display screen with keyboard, an audio unit, and an image projector. The display screen and keyboard resemble a TV screen located above an electric typewriter. The student receives messages from the screen in the form of English sentences, arithmetic expressions, or pictures. The student responds by typing on the keyboard. Whatever he types can be displayed immediately on the screen. The audio unit plays prerecorded tapes to the student via a headset and the image projector displays black-and-white or color images that have been reproduced on a 16 mm film cartridge. (This last device is not as yet being used by this course.)

Even when sixteen students are working simultaneously, only one supervisor or proctor is necessary. By sitting at his own terminal, the proctor can monitor the progress of all the students.

The course itself is a series of arithmetic expressions in the form,

$$a * b = c$$

where a , b , and c are integers and the operator $(*)$ may be addition, subtraction, multiplication, or division. Because the course was developed with research in mind, the integers are generated randomly by the computer. (Obviously, only two of the integers for any given expression are generated.) At present the numbers which are generated are between zero and nine. Note, however, that a number as large as eighteen may appear in the "c" position for addition or the "a" position for subtraction and a number as large as eighty-one may appear in the "c" position for multiplication or the "a" position for division.

When an expression is presented on the screen to a student, one of the numbers is missing; the student solves the expression by supplying the missing number. There are three types of problem.

Type I: $a * b = \text{---}$

Type II: $a * \text{---} = c$

Type III: $\text{---} * b = c$

The problems in the present program are always presented in the order listed above, Type I first, then Type II, and finally Type III. The operations are presented in the order addition, subtraction, multiplication, and division. A student receives all four operations in Type I expressions before he receives any of the other types. It is possible for the proctor to vary the operations presented as well as the type of expressions given. This will be explained in a later section.

When the student "signs on" to begin the course, full instructions are given by the computer. Audio messages are interspaced with examples on the display screen. The course is so designed that proctor intervention should be unnecessary in most cases. If the student understands the instructions (is able to press the space bar on the keyboard), then the course commences. A script of the audio introduction is shown in AA1 of the audio script below.

The numbers which are presented in the arithmetic expressions are actually "graphics" or pictures which are approximately one inch high, six times the size of the numbers which would usually appear on the screen. These large graphics were created so that young children would be able to recognize them more easily.

The student answers or solves the expression by pressing a number on the keyboard. If he has answered correctly, two forms of reinforcement are given. His answer appears immediately in the blank position of the arithmetic expression and brief words of encouragement are fed to him through the headset. These audio messages are shown in AA2. If he has answered incorrectly, his answer is displayed at the bottom of the screen, superimposed with an "X". The correct answer is then displayed in the blank. No audio message is given.

A student is allowed thirty seconds to respond to a problem. If he does not answer in the allotted time, an audio message (AA3) reminds him to respond more quickly. The correct answer is then displayed in the blank.

When a student has completed the course, an audio message (AA4) directs his attention back to the screen where a summary of the number of problems answered correctly and the number answered incorrectly appears. The number of problems presented to students is variable, and is controlled by the proctor when he registers a student to take the course.

Audio Script

AA1: *Hello. Today we are going to work on arithmetic. I will give you a series of arithmetic problems. They will be in the form two*

plus three is equal to five. Look at the sample problem on the screen.

(End of segment—Pause!)

Each time, one of the numbers will be missing. Your job is to supply the missing number. For instance, I might give you the problem two plus three is equal to blank. Look at the problem on the screen.

(End of segment—Pause!)

You would supply the missing number, in this case a five.

(End of segment—Pause!)

I might give you the problem in this form, two plus blank is equal to five.

(End of segment—Pause!)

You would supply the missing number, a three.

(End of segment—Pause!)

Or I might give you the problem blank plus three is equal to five.

(End of segment—Pause!)

You would, in this case, supply the two.

(End of segment—Pause!)

Watch the sign carefully. It may not always be a plus sign. Remember that you are to fill in the blank wherever it appears. On the top row of the keyboard in front of you, you will see numbers. Instead of writing down your answer to a problem, you will give me the number by pressing those keys. Note that the numbers are from zero to nine. If the answer to a problem is larger than nine, you will have to press two keys. For instance, if the answer to a problem is thirteen, you will press first a one and then a three. When you have pressed the number that you want, you must then press the long space bar at the bottom of the keyboard. If you have answered correctly, your answer will appear in the blank. If you have not answered correctly, your answer will appear at the bottom of the screen. The correct number will then appear in the blank. If you do not understand these instructions, raise your hand and someone will come to help you. If you do understand, press the space bar at the bottom of the keyboard and we will begin.

** * **

AA2: Good!

(End of segment—Pause!)

Correct!

(End of segment—Pause!)

Right!

(End of segment—Pause!)

You are doing very well!

(End of segment—Pause!)

Very good!

AA3: *You will have to answer more quickly. Remember that once you have pressed the number you want, you have to press the space bar at the bottom of the keyboard.*

** * **

AA4: *You have worked very hard. On the screen you can see how many problems you have done correctly. Goodbye for now.*

Controls

The proctor can control almost every aspect of the course by specifying certain course parameters when the student is registered for the course. Numbers can be entered which will control the number of problems (if any) of each operation that will be presented to the student.

The actual numbers which appear in the expressions are generated randomly by the computer. The proctor, however, may specify the maximum value of numbers which appear in multiplication and division expressions. He might set a limit of twenty-five, for instance. The numbers which would appear in the multiplication and division expressions would still be generated randomly but no product or dividend would exceed twenty-five.

The proctor may also specify in advance which type of problem or which combination of types he wishes to appear. For example, the proctor might specify ten addition and twelve multiplication problems of the first and third types. In this case, no subtraction or division problems would appear. Nor would there be any Type II expressions. The course would consist of a total of forty-four problems, ten of each type of addition and twelve of each type of multiplication.

A record (performance recording) is kept automatically for each student. From this record which is stored internally by the computer, we can see each problem that was presented to the student, the student's answer to the problem, and how long it took for the student to respond. These records may be analyzed by hand or by a FORTRAN program on the IBM 360/67.

A careful study of the documentation would allow a user to modify the course and adapt it to his own specifications.

Some Possible Applications

The program was originally intended as a research task for the study of individual differences in learning. However, its structure is sufficiently flexible that it can be adapted to a number of different uses.

Minor modifications to the program will allow the study of transfer between various types of problems (i.e. Type I, II and III), various types of arithmetic operations and complex transfer effects involving both problem types and different operations. Other intriguing research could involve studies of the effects of concentrated drill in basic number operations at various developmental levels on attitude to mathematics and understanding of more complex mathematical concepts. Both studies of performance on the program itself and studies of transfer with the program acting as a training task and school performance as the transfer task offer a great variety of research possibilities.

The program can be used in its present form as a test of achievement in arithmetic or as a criterion task in the comparison of different methods of instruction. A criterion or achievement test that provides information both on the correctness of a response and response latency is a powerful instrument. Didactic programs illustrating basic numerical operations are currently being written and the existing program will be useful in their evaluation.

The program might also be used in diagnosing learning difficulties. A careful analysis of the performance recording for a student may reveal specific areas in which he is having trouble. For example the concept of zero or the idea of unity might be confusing the student. An investigation of the student's performance on Type II and Type III expressions would give information beyond that of the student's ability to perform simple arithmetic operations. A deeper understanding of the operations and of the relationships between different operators is required to solve the second and third types of expressions. (It appears, based on the results of those who have taken the course during its development, that Type III subtraction and division expressions present the greatest challenge to the young student.)

Modifications of the course might result in a program which would give drill in weak areas. Zeroes could be programmed to appear more frequently than they would by chance. An expression solved incorrectly might be programmed to reappear more frequently until it is solved correctly. The order in which the problems are presented might be altered so that the same numbers would appear in all three types of expressions in sequence. A variety of combinations in which identical numbers appear with different operators might be imagined. Indeed the possibilities are extensive.

There is one further application which should be mentioned: the course is well adapted to demonstration. It incorporates most of the functions which are available with the 1500 System and has content that is easy to understand. It would therefore appear to be an appropriate demonstration of CAI.

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The Modification of Syntactic Style Through Modelling

The influence of socially reinforcing a model (model-reinforced), and, socially reinforcing a model and a subject (double-reinforcement) on increasing the frequency of passive constructions was studied with thirty male Ss, ages nine to eleven years. Thirty SS were randomly assigned to two treatment conditions (model-only reinforced, and, model and subject reinforced). Results support the conclusion that reinforcing a model and/or S increases the frequency of Ss' passive construction. No significant differences were observed between model-only reinforced, and, model and subject reinforced conditions.

Much of the recent research in the area of psycholinguistics has dealt with formulating categories of syntactic structure (Menyuk, 1963; 1964). Although such approaches provide systems for a description of rules used to generate sentences, they say very little regarding variables related to the acquisition and modification of syntactic structure.

Research, within the framework of social learning theory (Bandura & Walters, 1963a; 1963b; Bandura, Ross & Ross, 1963; Bandura, 1965; Bandura & Harris, 1966; Bandura, 1968), provides evidence that modeling plays an important role in the acquisition of deviant, as well as conforming behavior. Bandura and Harris (1966) suggest that modelling variables "play a highly influential role in the development of, and the modification of a child's syntactic style" (p. 341). They submit that children cannot acquire words and syntactic structures without exposure to verbalizing models. According to this point of view, modelling is required for language acquisition.

Some psycholinguistic theories, however, hold that modelling var-

ables play a limited role when responses are complex, such as in language development. The reasoning (Brown & Bellugi, 1964; Menyuk, 1964; Gough, 1967; McNeil, 1966) seems to be as follows: Children can construct an infinite variety of sentences that have never been modelled, therefore, the child must learn a set of rules which enable him to generate an unlimited variety of grammatical sentences. Bandura and Harris (1966), however, suggest that the limitations attributed to modelling processes are due to the erroneous assumption that exposure to verbal modelling of significant others can produce at most only those specific responses which have been modelled. Some experiments (Bandura & MacDonald, 1963; Croner & Willis, 1961; Berkowitz & Green, 1966) demonstrate the generalization of imitation responses to stimulus situations not provided in the modelling condition. In these experiments it has been found that *S* has generalized the *M*'s responses in different stimulus situations.

Social learning theory (Bandura & Walters, 1963) suggests that it is extremely unlikely that the rules governing syntactical constructions could be learned if at first examples had not been verbally presented by a model. Hess and Shipman (1965), Jensen (1967), Bernstein (1967), provide evidence to suggest that the syntactical constructions of children closely parallel the syntactical constructions of significant others in their environment. Thus it is suggested that a child's syntactic style would reflect the style of the models in his environment.

Bandura and Walters (1963a), emphasize the need to differentiate between the *acquisition* of, and the *performance* of modelled responses. A study by Bandura, Ross and Ross (1963) support the assumptions stated by Bandura and Walters which suggest that the acquisition of responses is contingent upon modelling alone, while the probability associated with the performance of the response is increased following the reinforcement of *S*. Thus, reinforcement and the informative properties of differential reinforcement may "enhance acquisition by facilitating discrimination" (Bandura & Harris, 1966, p. 343).

Language is difficult to acquire because sentences represent considerably complex stimulus and response patterns. It would seem, therefore, that the identification of complex syntactic structures are not easily discriminated in the absence of differential reinforcement. The present experiment was designed to investigate the effects of modelling and reinforcement on the modification of syntactic style.

Method

The syntactic style chosen for modification was the passive construction (e.g. "the cat was chased by the dog"). Following the observation of a model, boys between ages nine and eleven years were asked

to generate sentences in response to nouns on stimulus cards. Two independent variables (model reinforced; model and subject reinforced) were selected in order to determine the contribution of each to the modification of syntactic style. These independent variables included exposure to an adult model who generated sentences in response to nouns presented on cards containing the passive structure, and, informative feedback provided by positive social reinforcement contingent upon *M*'s and *S*'s generation of a passive construction. It was assumed (Bandura & Harris, 1966) that vicarious reinforcement would be necessary for the child to discriminate the syntactic form being modelled. It was also assumed (Bandura, Ross & Ross, 1963; Mausner & Bloch, 1957) that contingent *S* reinforcement would be additive to the *S*'s vicarious reinforcement.

Consequently, it was predicted that children in a model-reinforced treatment condition, would produce a significantly greater number of passive constructions than they would in a base rate assessment, and that children in a double-reinforcement treatment condition would produce a significantly greater number of passive constructions than they would in a base rate. In addition it was predicted that children in a double-reinforcement treatment condition would produce a significantly greater number of passive constructions than children in a model-only reinforced treatment condition.

The 30 boys used as *Ss* were drawn from the third, fourth and fifth grade classes (age 9-11) of a school serving a predominantly lower middle-class white community located on the southern end of Vancouver Island, British Columbia, Canada.

The basic procedure was the same for all *Ss*. The *Ss* were tested individually. At the outset each *S* was told that *E* was interested in how children make sentences and that upon being shown a card with a word written on it he would be asked to form a sentence using that word. The base-rate measure was established by the presentation of twenty words, one at a time, to each *S*, without reinforcement. The *S*'s sentences were recorded by tape and were later scored according to the frequency of passive constructions which occurred.

For the modelling conditions the *S* was told that the *E* was also interested in how children and adults make sentences. The adult *M* was introduced to the *S* and instructions were given. The *M* and *S* alternated in generating sentences. The *S* was told that if he could not read a particular stimulus word it would be identified for him. He was also told that any sentence he generated would be acceptable, provided it contained the word on the stimulus card. Of the sixty-five stimulus cards, sixty randomly selected cards were used for each *S*. If a child did not know the meaning of one of the words, or could not use it in a

sentence within thirty seconds, one of the five remaining words was substituted.

Model-reinforced treatment occurred immediately following the base-rate assessment. The *M* and a random selection of 15 *Ss* from the base-rate sample were presented 20 words each, one at a time. The *M* and *S* alternated in generating sentences with the 40 stimulus words. Contingent upon generating a passive construction the *M* was socially reinforced (e.g., "That's a very good sentence") by *E*. The *S* received no social reinforcement from *E*.

The double-reinforcement treatment occurred immediately following the base-rate assessment. The *M* and a random selection of 15 *Ss* from the base-rate sample were presented 20 words each, one at a time. The *M* and *S* alternated in generating sentences with the 40 stimulus words. Contingent upon generating a passive construction, *M* was socially reinforced and contingent upon generating a passive construction *S* was socially reinforced.

Result and Discussion

The results presented in Table 1 and Table 2 seem to support the prediction that model-reinforced and double-reinforcement treatment conditions are associated with an increase in the number of passive constructions made. The results, Table 3, however, do not support the prediction of a difference between the number of passive constructions

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR BASE-RATE, AND, MODEL-REINFORCED

Conditions	M	SD	t
Base-Rate	0.00	0.00	1.96*
Model-Reinforced	.73	1.43	

* $P < .05$

occurring within the model-reinforced condition and the number of passive constructions occurring when the model and the subject are reinforced.

The results of the base-rate assessment (see Tables 1 and 2) seem to indicate that the passive construction is not commonly used among boys ages nine to eleven. Bandura and Harris (1966) and Crawford (1967) suggested that a possible explanation for the infrequency of

TABLE 2

MEANS AND STANDARD DEVIATIONS, FOR BASE-RATE, AND, MODEL AND SUBJECT REINFORCED

Conditions	M	SD	t
Base-Rate	0.00	0.00	2.98*
Model and Subject Reinforced	1.20	1.55	

* $p < .005$

TABLE 3

MEANS AND STANDARD DEVIATIONS FOR MODEL-
REINFORCED, AND, MODEL AND SUBJECT REINFORCED

Conditions	M	SD	t
Model-Reinforced	.73	1.43	.88
Model and Subject Reinforced	1.20	1.55	

passive construction observed in the base-rate may be a function of the age of the Ss and their consequent inexperience with the passive construction in their oral language.

The results of Table 3 indicate there is no significant difference between the model-reinforced and the double-reinforcement treatment conditions ($p > .05$). A possible explanation of this finding may be found with Bandura and Harris (1966), who state that "the majority of Ss did not produce a single passive phrase (defined in this study as passive construction), and consequently, there were no responses that could be reinforced" (p. 350). It would seem that the mean number of passive constructions (see Tables 1 and 2) generated by Ss in this study may not have been sufficient, so that contingent reinforcement upon the performance of the double-reinforced Ss would have had any significant effects.

The data collected in this study seem to suggest that imitation learning of modelled responses tends to modify the syntactic constructions of S. The significant comparisons (see Tables 1 and 2) between the base-rate and treatment conditions lend support to the argument

of Bandura and Walters (1963a) who suggest that imitation is a significant variable in the modification of novel responses. The absence of passive constructions within the base-rate would further support this logic in that no passive constructions were generated by Ss, however, following model and double-reinforcement, passive constructions were generated by Ss. No evidence is available to suggest that the passive constructions would be used in further oral language on the part of the Ss, however, it seems reasonable to assume that if further reinforcement was made contingent on the generation of passive constructions perhaps such constructions would occur more frequently.

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Differences Between Influential and Non-Influential Administrators

The attitude toward change held by a principal is not necessarily related to the amount of innovation in the school. The data presented in this report suggest, however, that principals who are influential either in promoting or preventing change are different in several ways from principals who are not influential. In general, influential principals tend to be older and to have more education than their peers. They have usually had more than one principalship, and they are more aware of the informal organization in their schools. These data, which also show that vice-principals are more influential than is generally recognized, have a number of important implications for administrators.

Much of the research which deals with innovation in education has been based on the assumption that the major impetus for change in any system is generally from the outside (Griffiths, 1964, p. 431). A number of studies have provided support for this assumption. Carlson (1962), for example, reports that more change takes place in school districts when vacancies in the superintendency are filled by outsiders rather than by persons who have had some experience in the district. Similarly, Rappel (1965) has found that there is more change in a school when the newly-appointed principal comes from another school or district rather than from within the school.

In spite of findings such as the above, it may be argued that the individuals who must finally act to implement change are often the teachers in the classroom. Miles (1965, p. 12) suggests that studies like those by Carlson suffer somewhat from a "great man" tendency, and that not sufficient attention is being paid to internal organizational factors.

Consistent with the "great man" tendency, recent research and

theory-building have led to the development of the "change agent" concept. Generally the change agent is considered to be a single individual who is introduced into the system from the outside with the specific purpose of disturbing the equilibrium and thus forcing the system, through the functional interplay of its component parts, to achieve a new, and presumably more desirable, level of equilibrium. Basically there is probably no reason to reject the theoretical reasoning underlying this approach, but the usual preoccupation with the principal and the superintendent as change agents may be ignoring the possibility that less visible individuals, because of their greater acceptance in the informal organization, may be more effective in promoting or preventing change than their more visible superiors.

In a report on the preliminary findings of a study dealing with influence structures and innovativeness in schools (Wiens, 1968a), it was stated that the attitude toward change held by the principal of a school is not significantly related to the amount of innovation in his school (Wiens, 1968b). Further analysis was subsequently undertaken to find possible answers to two further questions:

1. Do those principals whose attitudes toward change *are* in line with the actual level of innovativeness in their schools differ in any way from principals whose attitudes are unrelated to the actual level of innovativeness?

2. What is the relationship between the vice-principal's attitude toward change and the level of innovativeness in the school?

In reporting the results of this latest examination of the data several cautions should be observed. First, the design of the study does not make it possible to make any definite claims regarding causality. While the use of terms "influential" and "non-influential" assumes that the attitudes of the former group of principals have determined, to some extent at least, the level of innovativeness in their schools, this assumption may in fact not be valid. Second, the original study was not planned specifically for the purpose of examining differences between influential and non-influential principals, and the design is therefore not completely adequate for this task. In spite of this, it is suggested that the tentative findings reported below present some interesting possibilities which should lead to further studies whose major purpose would be to examine the reported relationships from a more carefully considered theoretical base and by means of a more adequate design.

Method

Data were collected from the teachers and principals in 33 schools enrolling grades one to nine. The schools included all those in three large city districts whose principals and teachers were willing to take

part in the study. Attitudes toward change were measured by means of a Likert-type questionnaire named the Teacher Opinion Questionnaire. This questionnaire was tested for reliability in a pilot study using 73 teachers from the five largest schools in a medium-sized district. The coefficient of internal consistency based on the split-half technique was .866, while the coefficient of stability based on the test-retest method was .805.

The innovativeness of the schools in the sample was measured by means of the Teacher Practices Questionnaire which consisted of ten items dealing with the following innovations: educational television, teacher-parent interviews during the teaching day, use of consultant services, use of assistance from instructional services centers, observation of other teachers, team teaching, use of experimental units or courses, participation in in-service education projects and the use of audio visual equipment. The School Innovativeness Score (SIS) is the mean score obtained by the teachers in any particular school on the Teacher Practices Questionnaire. The SIS in this sample ranged from 16 to 23 with a mean of 19.00 and a standard deviation of 1.88 (See Table 1).

TABLE 1
INNOVATIVENESS AND ATTITUDE SCORES

Variable	N	Range	Mean	Standard Deviation
School Innovativeness Score (SIS)	33	16 - 23	19.00	1.88
Principal Attitude Score (PAS)	31	40 - 73	56.76	7.94
Vice-Principal Attitude Score (VPAS)	31	38 - 73	55.73	7.44
Teacher ¹ Attitude Score (TAS)	33	51 - 61	55.85	2.15

In order to find possible answers to the first question posed earlier, the schools in the sample were divided into high and low groups on the basis of their scores on the Teacher Opinion Questionnaire. In both cases the median was used as the dividing line between high and low groups. This categorization made it possible to develop the typology shown in Table 2 which identified influential principals as those whose attitudes toward change are congruent with the level of innova-

tion in their schools, while non-influential principals are identified as those whose attitudes are not congruent with the actual amount of innovation. At this point in the procedure the principals from cells 1 and 4 were combined into one group and labelled "influentials" while those from cells 2 and 3 were combined and labelled "non-influentials". In the findings reported below these terms will be used to refer to principal groupings derived in this manner.

TABLE 2
CLASSIFICATION OF PRINCIPALS AS INFLUENTIALS AND NON-INFLUENTIALS

Principal Attitude Score	School Innovativeness	
	High	Low
High	Influential Principals (N = 11)	Non-Influential Principals (N = 5)
Low	Non-Influential Principals (N = 6)	Influential Principals (N = 11)

Results

Influential Versus Non-Influential Principals.

Table 3 shows the results of a series of t-tests whose purpose was to determine whether any statistically significant difference could be found between influential and non-influential principals, their schools and their teachers. Because of the small number of schools in the sample it was decided to make decisions with respect to significance in the following manner: (1) accept as significant those results which reach or exceed the .05 level of significance using a two-tailed test, (2) consider as clearly non-significant those results which do not reach the .20 level of significance, and (3) reserve judgment when the significance level is between .05 and .20.

From Table 3 it can be seen that influential principals have more education than do non-influential principals. The average influential principal has nearly six years of education beyond Grade 12, while the average non-influential principal has five. Similarly, influential principals have better educated teachers in their schools, although this finding may have more statistical than practical significance. The small difference in years of education beyond Grade 12 is statistically

TABLE 3
CHARACTERISTICS ASSOCIATED WITH INFLUENTIAL AND NON-INFLUENTIAL PRINCIPALS

Variable	Means		Standard Deviations		df	t	p (2 - tail)	p corrected (Welch) (2 - tail)
	Influentials (N = 22)	Non-Influentials (N = 11)	Infl.	Non-Infl.				
Principal Education (Years beyond Gr. 12)	5.73	5.09	0.45	0.79	31	2.858	.01	.01
Mean Staff Education (Years beyond Gr. 12)	3.20	2.88	0.35	0.29	31	2.530	.02	
% of Staff Considered Influential by Prin.	19.64	11.45	10.81	7.96	31	2.159	.04	
% of Staff Relied on for Advice by Principal	19.91	12.27	21.29	8.40	31	1.110	.28	.14
% of Staff Socialized with by Principal	8.82	10.55	7.87	11.63	31	0.488	.63	.66
% of Staff Communicated with by Principal	25.86	29.73	16.87	27.25	31	0.485	.63	
Principal's Age	50.86	44.00	7.50	11.12	31	2.030	.05	.07
Mean Staff Age	35.07	36.06	3.35	3.11	31	0.798	.43	
Years as Principal (this school)	6.86	5.73	5.99	4.75	31	0.532	.60	
Years as Principal (all schools)	13.95	8.73	7.07	6.41	31	2.000	.05	
Mean Staff Satisfaction	19.29	20.51	1.76	1.91	31	1.775	.09	
Principal Satisfaction	23.14	22.82	3.03	2.66	31	0.286	.78	
School Size (no. of teachers)	23.05	19.64	6.83	4.75	31	1.440	.16	

significant because of the very small variances in the case of both principal and teacher education.

A more interesting finding reported in Table 3 is that influential principals consider more of their teachers to be influential in the school than do non-influential principals. When principals were asked to identify the individuals who are most influential in their schools, influential principals named nearly twice as many teachers as did non-influential principals.

Not unexpectedly, Table 3 shows further that influential principals tend to be older than their less influential colleagues. In addition, they have had more total experience as principals. It should be noted, however, that the length of tenure in their present schools is not different for the two groups of principals.

Three variables reported in Table 3 did not meet the significance level regarded as necessary for acceptance of the proposition that a significant difference between means exists, but in each case the results could be considered doubtful and in need of further study. These are teacher satisfaction, school size and the willingness of the principal to rely on his teachers for advice.

Table 3 shows that there are no significant differences between influential and non-influential principals on the following: (1) the age and experience of the teachers in their schools, (2) the percentage of teachers with whom they communicate regularly on school matters or with whom they socialize, (3) the principal's satisfaction, and (4) the number of years the principal has been in his present school.

The Vice-Principal As An Influential

The design of the original study referred to earlier in this paper made it possible to identify the formal communication and reliance

TABLE 4
CORRELATIONS BETWEEN ATTITUDES TOWARD CHANGE AND SCHOOL INNOVATIVENESS

Variable Correlated with Innovativeness	N	r	P (2-tailed test)
Principal Attitude Score	33	.218	N.S.
Vice-Principal Attitude Score	31*	.626	.005
Total Staff Attitude Score	33	.314	N.S.

* Two vice-principals could not be identified from the data received from the schools.

networks in each of the schools in the sample. Almost invariably the vice-principal was a key figure in these networks. Since persons in central positions in the informal organization tend to assume major decision-making functions (Keltner, 1961, p. 28), it was decided to examine the relationship between the attitude toward change held by the vice-principal and the level of innovativeness of the school. The results of this analysis, shown in Table 4, indicate that there is a significant relationship between these variables in the schools in this sample.

Implications

Tentative though they may be, the results of this analysis may have a number of important implications both for principals and for those who are responsible for appointing principals and vice-principals to their positions.

The first implication follows from the finding that there is a highly significant relationship between the attitude toward change held by the vice-principal and the actual amount of innovation in the school. From Table 4 it can be observed that this may be a genuine indication of the vice-principal's ability to exert influence, for if he were merely reflecting the attitudes of the teachers or the principal the correlation between the latter's attitude scores and innovativeness should also be high. In view of these data, it seems likely that the vice-principal's status as an influential is due not to his formal position, but to the teachers' perception that the vice-principal is a teacher like themselves and that he can therefore be relied upon to give useful advice. The principal, on the other hand, is probably perceived as one who is too far removed from the classroom situation to be able to understand a teacher's problems. It may even be that the principal's formal status presents a barrier which prevents him from being accepted by the teachers, and that his advice is therefore rejected not because it is poor advice but because it comes from a person who is perceived as an outsider.

The vice-principals have generally been regarded as a position in which a teacher may gather experience and gain insights which will help him to become an effective principal. It is rarely admitted that the role of the vice-principal has more than a token leadership component. But if the findings of this study can be generalized beyond the present sample, it is obvious that vice-principals will have to be chosen not only for their potential as future leaders, but with the expectation that, as vice-principals, they will play a prominent role in charting the course which will be taken in their schools on such important topics as innovation and change.

The second implication is based on the finding that influential

principals nominate nearly twice as many teachers as do non-influential principals when both are asked whom they consider to be influential in their schools. In other words, the non-influential principals are less aware of the power of the informal organization and its leaders. It is not surprising that this lack of awareness is more prevalent among less educated principals. Since one of the purposes of advanced programs in educational administration has long been to sensitize prospective principals to the less obvious but potentially powerful dynamics of informal organizations, persons planning a career in administration would do well to include some course work in organization theory in their professional preparation.

A third implication is based on the finding that influential principals generally have more experience as principals than do non-influential principals. It is important to note, however, that length of experience in the principal's *present* school is not the significant factor; rather it is the principal's *total* experience as a principal. The data of Table 3 suggest that influential principals are more likely to have had previous administrative experience than is the case with non-influential principals. This may suggest that there is some merit in the practice in some districts of moving principals to different schools after a few years in one place. This may be particularly useful when it involves a person who is in his first principalship.

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Teacher Satisfaction in Team and Conventional Teaching Situations

Data were collected from 69 teachers working in team teaching schools and 79 teachers working in more conventional schools to compare job satisfaction in these two teaching situations. The t test was used to compare the mean scores of the team teachers and the conventional teachers on each of the ten satisfaction factors of the Purdue Teacher Opinionnaire. The team teachers expressed significantly lower satisfaction with "Teacher Salary" than did the conventional teachers, but were significantly more satisfied with "Curriculum Issues," "Community Support of Education," and "School Facilities and Services." The increased satisfaction associated with team teaching which is suggested by these findings was less than is commonly proposed.

Team teaching, a practice which has been evolving on the educational scene since about 1955, has assumed the dimensions of a major educational movement in Canada. However, as with many other educational innovations, its introduction was heralded by many claims concerning educational and other benefits which were sadly lacking in any supportive research.

Schools in Edmonton, Alberta, may be considered as representative of this movement. All of the newer schools in both the Edmonton Public and Separate School Districts have built-in team teaching features. These include large open areas, small conference rooms, individual study space, team work rooms and resource centers. New additions to existing schools also have such features included in their design, and administrators appear to be encouraging team teaching, even in schools which

do not have appropriate physical facilities. In the public system, new positions such as "coordinator" have been created and, in addition to other duties, the incumbents of these positions serve as "team leaders" in their schools. Preparation time is being allotted to schools rather than to individual teachers so that adequate time can be given to those teachers involved in team teaching. Evidence such as this points to a definite long-term commitment to this form of school organization in both school systems in Edmonton.

Because of this commitment, and because of a lack of agreement in the literature concerning the association between teacher satisfaction and various teaching arrangements, a research study (Diemert, 1969) was conducted in both Edmonton school systems in 1969. The general research question was the following: Does team teaching produce higher teacher satisfaction than does teaching in more conventional settings?

Background to the Problem

Introduction of a new practice is usually accompanied by comparisons with "the way things were done before." Which method produces the better results? Which method do teachers prefer? Which method do students prefer? Which method is the more economical?

One of the most pressing questions which school administrators are faced with is, "Which form of school organization results in the greatest job satisfaction among teachers?" This question becomes particularly pertinent when one considers the complex relationship between job satisfaction and performance, as well as quotations such as the following from Griffiths (1956): "In many respects, teaching is the least satisfying of all the professions because it is so difficult to see the results of one's labors [p. 146]." Many writers claim that team teaching does provide a means through which teachers can derive a great deal more job satisfaction. This is illustrated in the following quotation from Beggs (1966):

Team teaching can give the individual teacher increased professional stimulation and satisfaction as a result of contacts with colleagues about ideas, methods of instruction and students. Such stimulation and satisfaction is a morale booster. The exchange of ideas with another teacher and the feeling of accomplishment when a teacher verifies a contention with another teacher builds a sense of well-being and satisfaction [p. 46].

Although Beggs focuses on "team work," other factors have also been claimed to contribute to increased satisfaction through team teaching. Bair and Woodward (1964, p. 213) contend that increased recognition of individual skills and talents and the opportunity to know pupils better are contributing factors. Bischoff and Enns (1967, p. 4) observed an increase in the prestige of team members in the eyes of other teachers in the community. Dean (in Hillson 1965, p. 215) refers

to better communication and increased motivation and cooperation in team teaching.

However, not all writers are so optimistic about the beneficial effects of team teaching upon job satisfaction. Meyer (1968, pp. 362-364), for example, notes that a measure of jealousy and envy is often directed toward the team teaching program by teachers involved in the more conventional teaching situation. Team teachers are criticised for keeping to themselves as a group and consequently communicating less with other staff members. Beggs (1966, p. 45) claims that teachers who work in self-contained classrooms find the transition to a team teaching situation very disarming. Lust (1968, pp. 36-37) points out that unless teachers are carefully selected for an "open-area" team teaching organization, disunity may result which could mean the failure of this form of school organization.

Such contradiction regarding the effects of team teaching on job satisfaction is not settled by a search of the literature. The only literature available that bears any association with satisfaction in team teaching comes from subjective reports of various team teaching projects, and from surveys of attitudes toward team teaching. Although these studies generally indicate that teacher satisfaction is enhanced in a team teaching situation, they can by no means be considered as conclusive (Diemert, 1969, pp. 13-26).

Teacher Satisfaction Study

Instrumentation

The Purdue Teacher Opinionnaire devised by Rempel and Bentley (1967) was chosen to measure teacher satisfaction. This contained 100 items from which the following ten factors were identified: teacher rapport with the principal, satisfaction with teaching, rapport among the teachers, teacher salary, teacher load, curriculum issues, teacher status, community support of education, school facilities and services, and community pressures. The Opinionnaire was administered by Rempel and Bentley to a sample of 3,023 high school teachers in Indiana and Oregon. Reliability was determined from a test/retest of the instrument. The correlations reported were all above 0.60, and most were 0.80 or greater. The validity was determined by both "expert judgment" and "peer selection" techniques. Since a strong relationship existed between the expert judgment criterion and peer selection, the instrument was concluded to have validity as an indicator of teacher job satisfaction.

Sample

The study was conducted in twelve junior high schools of the Edmonton Public and Separate School Districts. Six schools were identified as team teaching schools on the basis of the following criteria:

1. Team teaching in the school must be consistent with the following definition (Anderson, 1964, p. 83).

Team teaching is a formal type of cooperative staff organization in which a group of teachers accepts the responsibility for planning, carrying out, and evaluating an educational program, or some major portion of a program, for an aggregate of pupils.

2. The majority of the junior high school teachers in the school must be involved in team teaching.

After the team teaching schools were selected, an equal number of conventional schools was chosen. Although five of the twelve schools included elementary as well as junior high school students, the numbers of junior high school teachers and pupils in the sample of team teaching schools were approximately equal to the numbers in the conventional schools (Table 1).

TABLE 1
NUMBERS OF JUNIOR HIGH SCHOOL PUPILS
AND TEACHERS IN THE SAMPLE

	Range	Total	Mean
Team Teaching Schools			
Pupils	167-566	2202	367
Teachers	9-31	120	20
Conventional Schools			
Pupils	202-669	2208	368
Teachers	9-35	116	19.3

A total of 182 sets of questionnaires (Purdue and personal data) was distributed, and 148 of those returned were usable for the analysis. Sixty-nine were obtained from team teachers, and seventy-nine from conventional teachers. The total sample contained approximately equal numbers of male and female teachers, but the larger proportion of the team teachers was male (55 per cent) and the larger proportion of the conventional teachers was female (57 per cent). About 70 per cent of the respondents were married, and the distribution of the team and conventional teachers in each of the marital status categories was quite

similar. The distribution according to age tended to be positively skewed, and the majority of both the team teachers (72 per cent) and the conventional teachers (54 per cent) were less than thirty-one years of age.

First-year teachers constituted 16 per cent of the team teachers and 6 per cent of the conventional teachers. Teachers with less than ten years of teaching experience accounted for 88 per cent of the team teachers and 71 per cent of the conventional teachers. The distribution of the years of post-secondary education of both the team teachers and the conventional teachers was close to normal with a mode of four years of training.

As shown in Table 2, the team teachers were the younger group and had less teaching experience. However, the two groups had approximately equal numbers of years of post-secondary education.

TABLE 2
MEANS OF AGE, YEARS OF TEACHING EXPERIENCE, AND
YEARS OF POST-SECONDARY EDUCATION OF TEACHERS

Variable	Means	
	Team Teachers (N=69)	Conventional Teachers (N=79)
Age	29.4	32.3
Years of teaching experience	6.2	8.8
Years of post-secondary education	3.9	4.1

In addition, data obtained from the team teachers revealed that 51 per cent of the respondents were engaged in their first year in a team teaching situation, and 32 per cent were in the second year of team teaching. The initial and present enthusiasm of the respondents toward team teaching was perceived by the majority as either "high" or "very high," by nearly one-third as "moderate," and by only a small proportion as "low" or "very low." Nearly three-quarters had chosen to become involved in team teaching whereas the others were involuntarily assigned to their positions.

Hypotheses

Three null hypotheses were postulated for testing at the 0.05 level.

1. No significant difference exists in the job satisfaction factor scores between team and conventional teachers.
2. No significant correlation exists between the job satisfaction factor scores of team teachers and the length of their team teaching experience.
3. No significant difference exists in the job satisfaction factor scores between team teachers who elected a team situation and those who were involuntarily assigned.

Comparison between Team and Conventional Teachers

The *t* test was used to compare the mean scores of the team teachers and the conventional teachers on each of the ten satisfaction factors. The total scores, that is, the totals of the satisfaction factor scores, were also compared. As indicated in Table 3, the team teachers expressed significantly lower satisfaction with "Teacher Salary" than did the conventional teachers, but were significantly more satisfied with "Curriculum Issues," "Community Support of Education," and "School Facilities and Services."

The differences found on "Teacher Salary" were unexpected in view of the salary policies and bargaining procedures used in the Edmonton school systems. However, the lower satisfaction of the team teachers may have partially resulted from their fewer years of teacher experience, and from their sensitivity to the resultant salary differences.

Since the team teaching schools are frequently referred to as "experimental schools," and since many of the curricular innovations are first attempted in these schools, the differences found on "Curriculum Issues" possibly indicate the freedom that team teachers feel they possess in order to make necessary changes in the curriculum.

The differences may also be an indication of the greater satisfaction team teachers derive from having opportunities to exchange ideas pertaining to the organization of the curriculum with their colleagues, a feature of the working situation commonly associated with cooperative teaching.

The team teachers tended to be more satisfied with the degree of community support given to education in their areas. This may indicate the interest and support of the community in the team approach to school organization. Such interest may be perceived by the team teachers as a result of the numerous visits to the schools by individuals interested in observing cooperative teaching.

The differences found on "School Facilities and Services" revealed that team teachers are more satisfied with the facilities and services in their schools than are the conventional teachers. A possible explanation for this finding may be that team teaching schools in the sample are

TABLE 3

MEAN SATISFACTION FACTOR SCORES AND TOTAL SATISFACTION SCORES
OF TEAM TEACHERS AND CONVENTIONAL TEACHERS

Factor	Mean Scores [*]		t	Probability (2-tail)
	Team (N=69)	Conventional (N=79)		
1. Teacher rapport with principal	5.17	4.87	1.866	0.064
2. Satisfaction with teaching	4.98	5.04	-0.368	0.714
3. Rapport among teachers	5.05	4.98	0.385	0.700
4. Teacher salary	4.79	5.20	-2.563	0.011
5. Teacher load	5.01	4.99	0.076	0.939
6. Curriculum issues	5.42	4.66	5.025	0.000
7. Teacher status	4.99	5.03	-0.249	0.803
8. Community support of education	5.21	4.86	2.118	0.036
9. School facilities and services	5.40	4.66	4.819	0.000
10. Community pressures	4.89	5.15	-1.564	0.120
TOTAL SCORE	50.90	49.45	1.357	0.177

* Scores were normalized to a mean of 5.0 and a standard deviation of 1.0.

newer, have newer facilities, and contain features which are lacking in the conventional schools, such as large teaching areas, centrally located instructional materials centers, and closed circuit television. Furthermore, the facilities and services which are available in the schools may possibly be more readily utilized when a team approach is employed.

When viewed collectively, the mean scores shown for the two groups

in Table 3 were either quite close (Factors 2, 3, 5 and 7) or considerably different (Factors 1, 4, 6, 8, 9 and 10). Items producing similar mean responses warrant some attention from administrators involved in teacher assignment: for example, both groups were approximately equally satisfied with teacher load and status.

Years of Experience in Team Teaching

Significant positive Pearson correlation coefficients were obtained between length of team teaching experience and "Satisfaction with Teaching," "Community Support of Education," "School Facilities and Services," and the total satisfaction score (Table 4).

TABLE 4

PEARSON CORRELATION COEFFICIENTS BETWEEN LENGTH OF EXPERIENCE IN
TEAM TEACHING AND SATISFACTION OF TEAM TEACHERS

Factor	Correlation Coefficients	Probability
1. Teacher rapport with principal	0.079	0.520
2. Satisfaction with teaching	0.243	0.044
3. Rapport among teachers	0.137	0.263
4. Teacher salary	0.235	0.052
5. Teacher load	0.118	0.336
6. Curriculum issues	0.154	0.206
7. Teacher status	0.162	0.183
8. Community support of education	0.374	0.001
9. School facilities and services	0.257	0.033
10. Community pressures	0.101	0.407
TOTAL SCORE	0.250	0.038

As all the significant correlation coefficients were positive, teachers with more experience in team teaching tended to express greater job satisfaction than did those with less team experience. This possibly results from the initial frustration of teachers in a team situation when they encounter new relationships with other teachers and students, as well as other aspects of school organization which are different from the more conventional approach. However, since over 80 per cent of the team teachers had less than three years of team teaching experience, any generalization made in regard to these findings must take in account this lack of team teaching experience.

Method of Appointment to Team Teaching

The *t* test was used in the final hypothesis to compare the job satisfaction of the teachers who chose to become involved in team teaching with that of the teachers who were assigned to their team teaching positions without any choice. Testing of this variable was prompted by Davis (1966, pp. 38-39), who reported that the poorest attitudes toward team teaching were exhibited by those teachers who were forced into the program with no real understanding as to its purpose. Table 5 shows that no significant differences were found between the mean satisfaction factor scores of teachers who chose to become involved in team teaching and teachers who were assigned to their team teaching positions without any choice in the matter. However, the mean factor scores of those who elected team teaching were higher in every case, indicating a rather definite trend.

Other Findings

Further analysis was conducted which revealed that the following relationships were *significant* at the 0.05 level.

1. Female conventional teachers expressed greater satisfaction than did male conventional teachers on the "Teacher Status" factor. This was the only significant difference found between the job satisfactions of male and female teachers in either teaching situation.

2. Both male and female team teachers expressed greater satisfaction with "Curriculum Issues" and "School Facilities and Services" than did their counterparts in conventional teaching situations. Male team teachers indicated significantly higher satisfaction on "Teacher Rapport with Principal" and "Community Support of Education" than did male conventional teachers.

3. The age of the team teachers correlated negatively with "Teacher Status" and "Community Support of Education."

4. The number of years of teaching experience of the conventional teachers correlated positively with "Teacher Salary," and the number

TABLE 5

MEAN SATISFACTION FACTOR SCORES AND TOTAL SATISFACTION SCORES OF TEAM TEACHERS WHO CHOSE TO BECOME INVOLVED IN TEAM TEACHING AND THOSE WHO WERE GIVEN NO CHOICE REGARDING THEIR INVOLVEMENT

Factor	Mean Scores		t	Probability (2-tail)
	Chose (N=50)	No choice (N=19)		
1. Teacher rapport with principal	5.23	5.01	0.841	0.403
2. Satisfaction with teaching	5.08	4.72	1.379	0.172
3. Rapport among teachers	5.12	4.85	1.075	0.286
4. Teacher salary	4.84	4.65	0.748	0.457
5. Teacher load	5.09	4.79	1.188	0.239
6. Curriculum issues	5.45	5.34	0.474	0.637
7. Teacher status	5.10	4.71	1.452	0.151
8. Community support of education	5.32	4.90	1.709	0.092
9. School facilities and services	5.47	5.23	1.093	0.278
10. Community pressures	4.95	4.76	0.747	0.457
TOTAL SCORE	51.64	48.96	1.687	0.096

of years of post-secondary education of the conventional teachers correlated positively with "Teacher Load," "School Facilities and Services," and the total satisfaction score.

5. Team teachers who chose to become involved in team teaching had a significantly greater number of years of experience in team teaching than the teachers who were involuntarily assigned to their team teaching position.

Conclusions

The team teachers involved in this study expressed greater satisfaction than did the conventional teachers on three of the ten factors which were measured by the Purdue Teacher Opinionnaire—"Curriculum Issues," "School Facilities and Services," and "Community Support of Education." This finding offers some support to the speculation that team teachers are more satisfied with their working situation than are conventional teachers. However, because no significant differences were found on the factors of "Satisfaction with Teaching" and "Rapport Among Teachers," the formulation of generalizations on the basis of the obtained data is rather hazardous.

Consequently, administrators contemplating the implementation of a team teaching program in their schools should exercise caution in stating that one of the reasons is "because teachers experience more job satisfaction in this form of school organization." Instead, they may only be able to say that there are some factors associated with the job satisfaction of teachers which appear to be enhanced in a team situation.

Furthermore, should an administrator decide to adopt a team form of school organization, he should recognize that, although greater opportunities appear to exist in team teaching to experience greater job satisfaction through factors such as "Rapport Among Teachers," such satisfaction did not appear among the teachers involved in this study. Perhaps the method by which the team members are chosen, and the method by which the team form of school organization is introduced, may be determining variables in enhancing these aspects of the job satisfaction of team teachers.

This study has only scratched the surface of the whole area concerning teacher satisfaction in team teaching. Further research in this and all other aspects of team teaching is urgently needed, especially in light of the increasing commitment of school systems to this form of school organization. Replication of the reported research some years from now when more teachers have had longer periods of experience in team teaching would appear to be warranted.

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BOOK REVIEWS

STATING BEHAVIORAL OBJECTIVES FOR CLASSROOM INSTRUCTION. *By Norman E. Gronlund. New York: The Macmillan Company, 1970. 58 pp.*

The purpose of this monograph is to provide teachers and student teachers with direction in how to state instructional objectives in terms of identifiable pupil behaviors or performances. The first three chapters outline and illustrate the specification of instructional objectives as learning outcomes. The use of the *Taxonomy of Educational Objectives* (Cognitive Domain, Bloom, B. S., ed., *et al.*, New York: David McKay Company, Inc., 1956; Affective Domain, Krathwohl, D. R., *et al.*, New York, David McKay Company, Inc., 1964) in the preparation of behavioral statements of objectives is illustrated in the fourth chapter. Chapter five delineates some general considerations involved in the selection of appropriate behavioral objectives for a given area of instruction. In chapter six behavioral objectives are related to classroom instruction while the last two chapters describe their use in test construction and in reporting student progress. Also included in the monograph are a check list for evaluating objectives and a list of performance terms suitable for stating behavioral objectives in various subject areas.

The premise that behavioral specification of learning outcomes is desirable in instructional planning is accepted without much comment, but considerable attention is focused on stating such instructional objectives at an appropriate level of generality. The optimum seems to be a level general enough to give overall direction to the instructional process while remaining sufficiently specific to establish clearly the behaviors students are expected to demonstrate as a result of the instruction. To avoid the oversimplification which may occur when a variety of intended instructional outcomes are all stated in a form which implies a one-to-one relationship between the objective and the performance accepted as evidence of its attainment, Gronlund suggests a procedure in which a complex learning outcome, once specified, is clarified by listing a representative sample of the specific types of behavior considered indicative of its attainment.

In any given set of instructional objectives, there may be some which are essential for all pupils to attain and others which allow for individual variability in progress toward the goal. Gronlund agrees that learning outcomes at the "minimum essentials level" can be stated as specific tasks which are explicitly taught and directly tested. However, this training level of specificity becomes somewhat less appropriate when the objective represents a large class of responses indicative of a complex learning outcome. Gronlund maintains that teaching at this "develop-

mental level" is more likely to be directed toward the whole class of behaviors encompassed by the objective than toward any specific response which may be listed in the operational definition of the goal. The sampling approach proposed in this monograph could well prove useful to teachers as a manageable way of specifying complex learning outcomes in behavioral terms.

When the range of topics included is considered in relation to the length of the monograph, it is obvious that some areas are likely to be treated only in general terms. More particularly, the chapters dealing with selection of instructional objectives and measurement of the learner's attainment of the objectives tend to be so general as to provide only limited direction to the teacher who has to decide whether or not a given behaviorally stated outcome is worth attaining and how to go about assessing its attainment.

In summary, the monograph is concerned primarily with the form of a behaviorally stated objective rather than with its selection or the measurement of its attainment. Since illustrative material is drawn from numerous subjects, the monograph could be suitable as a concise practical guide to the behavioral specification of learning outcomes in a variety of subject areas. Many of the general points would probably require elaboration in terms of the particular subject area under consideration. If supplemented by a more extensive and possibly more subject-specific work on evaluation, the monograph could be useful in curriculum and instruction courses in teacher education programs. Individual classroom teachers might also find it helpful in clarifying their instructional goals.

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COMMUNITY SCHOOLS IN DEVELOPING COUNTRIES.

By H. Houghton and P. Tregear (Editors). *International Studies in Education* No. 23. Hamburg, Germany: UNESCO Institute for Education, 1969.

This valuable little book is the fruit of a ten days conference attended by seventeen educationists from nine countries. The conference considered the vexed problem of elementary education in the developing countries, and although the editors declare modestly that the book contains "nothing new," its concise and challenging presentation cannot fail to stimulate thought.

Elementary school enrolment has been rising rapidly in most developing countries but quantitative expansion has often been at the expense of quality. Hence frustration, drop-out, and at best a precarious degree of literacy which does not enable the pupil either to better his own lot or contribute significantly to national development. Many observers have therefore concluded that Governments should check elementary school expansion and concentrate instead on providing secondary school facilities for those who do succeed in completing the elementary grades. Our seventeen experts however take their stand on the incontestable fact that, in the very nature of the case, the majority of pupils will have no formal education beyond the elementary school. This being so, they feel that top priority must be given to improving the quality of education at elementary level, and they offer the community school as the most likely answer to the problem.

The community school is one which serves the whole community—juvenile, adolescent and adult. As far as children are concerned, they will indeed be educated "in the context of the community," but this does not imply any narrow concentration on vocational studies. On the contrary, literacy and numeracy will continue to be the teachers' chief concern and our authors express some scepticism about the value of curriculum reform as such, but teachers will not be preparing pupils for examination in accordance with a rigid curriculum prescribed from above. Thus, for example, they will be free to avoid sums involving the purchase of goods by weight, if in fact the community does not buy in this way. Environmental studies will loom large in the program, though of course the content will vary widely to suit local needs. The section on curriculum gives several examples of how problem solving techniques may be used to assist pupils to explore their immediate environment and progressively extend their purview to the wider world beyond. As a vital feature of this environmental studies program, elders of the local community will be invited to explain local customs, and craftsmen will be asked to demonstrate their skills to the children and talk about their work. Farmers and traders will also be involved as pupils make carefully planned visits to farms and markets. Thus the young, as they grow educated will not grow away from their community or from their parents, and this will be an incalculable social gain. The union of school and community will be cemented by the direct ministry

of the school to the adult and adolescent population. Adult literacy courses will be organized, there will be special programs of interest to women, and the school will be the centre for various evening activities for the menfolk of the community. The teachers will be neither able nor qualified to direct most of these activities, but they will initiate them and assist where possible. Teen-agers will be catered for by youth groups meeting on the school premises. These groups will probably have their origin in extra-curricular activities fostered by the school for its senior pupils. When the pupils leave school many of them will wish to remain members of the clubs which they enjoyed during their schooldays and so hopefully their education will not end when formal schooling ceases. Other young people, who never went to school, will be drawn in to join them, and thus the school will become in a very real sense the servant of the whole community and the enricher of it.

The prospect is an exciting one, and the evidence presented in appendices concerning individual community schools in several countries is certainly impressive. But some doubts remain. In the first place the teacher's role under the new system would clearly be more exacting than in the conventional school. Not only must they bring a new approach to their work in the classroom, but they must be community organizers as well. Their new role would not permit them to move too freely from one post to another, since they must put down roots and get thoroughly acquainted with the community they are serving. Our authors suggest, for example, that in agricultural communities it would be well for the teachers to work some land themselves. Secondly, community schools would have to meet the needs of the few who will go on to secondary education as well as those of the majority who will not. In practice one must anticipate some difficulty in achieving both these goals simultaneously. Again, environmental studies may bore rather than stimulate unless planned with exceptional care and imagination. Here also a great deal would be demanded of the teaching profession. Our authors are aware of some of these problems, and they prescribe an entirely re-organized teacher training program to produce teachers with sufficient skill and dedication for their task. It may be they are too optimistic, for teachers are but human. A final difficulty is that many parents quite naturally regard education as a means of enabling their children to escape from their environment, and enjoy a better life in a white-collar occupation. They would have considerable difficulty, at least initially, in comprehending the radically different philosophy embodied in the community school. Politicians, educational administrators and professors of education must work strenuously to lead public opinion if the community school concept is to become a reality. Our authors are men of vision; they are also men of faith.

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